9. Code list
9.1 G-functions

Function	Description	Addresses	Format metr.	(inch)	V, ?
G0	Rapid traverse (1)	X, Z	4,3	(3,5)	V
G1	Linear (1)	X, Z,	4,3	(3,5)	V, ?
		A	3,3	(3,3)	V
		B	4,3	(3,5)	V
		E	3,3	(2,5)	V
		Q	1,0	(1,0)	
G2	Circle CW (1) clockwise	X, Z,	4,3	(3,5)	V, ?
		I, K, R	5,3	(4,5)	V
		B,	4,3	(3,5)	V
		E	3,3	(2,5)	V
		Q	1,0	(1,0)	
G3	Circle CCW (1) counter-clockwise	X, Z,	4,3	(3,5)	V, ?
		I, K, R,	5,3	(4,5)	V
		B,	4,3	(3,5)	V
		E	3,3	(2,5)	V
		Q	1,0	(1,0)	
G4	Period of dwell (2,4) [sec.]	F	2,1	(2,1)	
G9	Precision stop (2,4)	none			
G12	Circle CW (1) clockwise centre absolute	X, Z,	4,3	(3,5)	V, ?
		I, K,	4,3	(3,5)	V
		B,	4,3	(3,5)	V
		E	3,3	(2,5)	V
		Q	1,0	(1,0)	
		R	5,3	(4,5)	V
G13	Circle CCW, (1) counter-clockwise centre absolute	X, Z,	4,3	(3,5)	V, ?
		I, K,	4,3	(3,5)	V
		B,	3,3	(2,5)	V
		E	3,3	(2,5)	V
		Q	1,0	(1,0)	
		R	5,3	(4,5)	V
G14	Engaging tool change point (1)	Q	1,0	(1,0)	
G26	Speed limitation, (1,3) main spindle [1/min]	S	4,0	(4,0)	V

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Function	Description	Addresses	Format metr.	(inch)	V, ?
G31	Longitudinal thread (2,3)	X, Z, I, K	4,3	(3,5)	V
		P, R,	4,3	(3,5)	V
		F,	3,5	(2,5)	V
		B,	1,0	(1,0)	
		Q	2,0	(2,0)	V
G32	Transversal thread (2,3)	X, Z, I, K	4,3	(3,5)	V
		P, R,	4,3	(3,5)	V
		F,	3,5	(2,5)	V
		B	1,0	(1,0)	
		Q	2,0	(2,0)	V
G33	Special thread (1)	X, Z,	4,3	(3,5)	V
		F	3,5	(2,5)	V
G35	Metric ISO-thread (1)	X, Z	4,3	(3,5)	V
		F,	3,5	(2,5)	V
		B	1,0	(1,0)	V
		Q	2,0	(2,0)	V
G40	SRK/FRK off (1,3,5)	none			
G41	SRK/FRK left (1,3)	none			
G42	SRK/FRK right (1,3)	none			
G51	Programmable allow. (1,3)	X, Z	4,3	(3,5)	V
G53	Zero point shift 1 (1,3)	none			
G54	Zero point shift 2 (1,3)	none			
G55	Zero point shift 3 (1,3)	none			
G56	Zero point shift 4 (1,3)	X, Z	4,3	(3,5)	V
G57	Allowance for (1,3) contour cycles	X, Z	4,3	(3,5)	V
G58	General allowance (1,3)	A	3,3	(2,5)	V
G59	Programmable (1,3) zero point shift	X, Z	4,3	(3,5)	V

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Function	Description	Addresses	Format metr.	(inch)	V, ?
G60	Protection zone f. (2)	none			
G61	Jump function (2,3)	H	(...)	(...)	
	Jump distributor	N, N, N	4,0	(4,0)	V
	Jump target 1 (H<0)				
	Jump target 2 (H=0)				
	Jump target 3 (H>0)				
G64	Intermittent feed	E, F	2,1	(2,1)	V
G74	Drilling cycle (2)	X, Z, P,	4,3	(3,5)	V
		R, A, B,	4,3	(3,5)	V
		W	4,3	(3,5)	V
		E	2,1	(2,1)	V
G77	PCD on (2)	Z	4,3	(3,5)	V
	frontface	I, K	3,3	(3,3)	V
		J	1,0	(1,0)	
		Q	2,0	(2,0)	V
G770	Angle circle	I, K	3,3	(3,3)	
	cycle	Q	2,0	(2,0)	V
G78	PCD on (2)	X,	4,3	(3,5)	V
	circumference	I, K	3,3	(3,3)	V
		J	1,0	(1,0)	
		Q	2,0	(2,0)	
G79	Milling key- (2)	X, Z	4,3	(3,5)	V
	ways	I	4,3	(3,5)	V
		K	3,3	(3,3)	V
		J	1,0	(1,0)	
G80	End of cycle (3)	none			
G81	Longitudinal (2,3)	X, Z, I, K,	4,3	(3,5)	V
	cycle	Q	1,0	(1,0)	
G817	Longitudinal	X, I,	4,3	(3,5)	V
	roughing	Q	1,0	(1,0)	
G818	Longitudinal	X, I,	4,3	(3,5)	V
	roughing	Q	1,0	(1,0)	
G819	Cycle contour	X, I, E	4,3	(3,5)	V
	longitudinal	Q	1,0	(1,0)	
		E	3,3	(2,5)	V

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Function	Description	Addresses	Format metr.	(inch)	V, ?
G82	Cross cycle (2,3)	X, Z, I, K Q	4,3 1,0	(3,5) (1,0)	V
G827	Cycle transversal cut	Z, K, Q	4,3 1,0	(3,5) (1,0)	V
G828	Cycle transversal cut	Z, K, Q	4,3 1,0	(3,5) (1,0)	V
G829	Cycle transversal contour	Z, K, Q E	4,3 1,0 3,3	(3,5) (1,0) (2,5)	V V
G83	Cycle contour	X, Z, I, K	4,3	(3,5)	V
G836	Cycle contour parallel	X, Z, I, K	4,3	(3,5)	V
G85	Undercut cycle (2,3) Form E/F, thread	X, Z, I, K, E, Q	4,3 3,3 1,0	(3,5) (2,5) (1,0)	V V
G86	Cycle grooving (2,3)	X, Z, I, K	4,3	(3,5)	V
G861	Cycle contour groove transversal	X	4,3	(3,5)	V
G862	Cycle contour groove longitudinal	Z	4,3	(3,5)	V
G863	Cycle contour keyway finishing transversal	X	4,3	(3,5)	V
G864	Cycle contour keyway finishing longitudinal	Z	4,3	(3,5)	V
G87	Cycle radius 90° (2,3)	X, Z, I	4,3	(3,5)	V
G88	Cycle chamfer 45° (2,3)	X, Z, I	4,3	(3,5)	V
G90	Absolute (1,3,5)	none			
G91	Incremental (1,3)	none			

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Function	Description	Addresses	Format metr.	(inch)	V, ?
G92	Tool file (1,3)	W	2,0	(2,0)	
		Q	1,0	(1,0)	
		X, Z,	4,3	(3,5)	
		I	1,3	(0,5)	
		K	3,3	(2,5)	
		A, B	3,3	(3,3)	
		C	2,1	(2,1)	
		E	3,3	(2,5)	
		L	4,3	(3,5)	
		T	6,0	(6,0)	
G94	Feed [mm/min (inch/min)] (1,3)	F	5,0	(4,1)	V
G95	Feed [mm/rev. (inch/rev)] (1,3)	F	3,3	(2,5)	V
G96	V constant (1,3) [m/min (feet/min)]	S	4,0	(4,0)	V
G97	Speed [rev/min] (1,3) main spindle	S	4,0	(4,0)	V
G100	Milling frontface (1)	X	4,3	(3,5)	V
	rapid traverse	C	4,3	(4,3)	V
G101	Milling frontface (1)	X	4,3	(3,5)	V
	linear	C	4,3	(4,3)	V
G102	Milling frontface (1)	C, I, J	4,3	(4,3)	V
	circle CW	X	4,3	(3,5)	V
		R	5,3	(4,5)	V
G103	Milling frontface (1)	C, I, J	4,3	(4,3)	V
	circle CCW	X	4,3	(3,5)	V
		R	5,3	(4,5)	V
G110	Milling circumf. (1)	Z	4,3	(3,5)	V
	rapid traverse	C	4,3	(4,3)	V
G111	Milling circumf. (1)	Z	4,3	(3,5)	V
	linear	C	4,3	(4,3)	V

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Function	Description	Addresses	Format metr.	(Inch)	V, ?
G112	Milling circumf. (1) circle CW	Z	4,3	(3,5)	V
		C	4,3	(4,3)	V
		J	3,3	(3,3)	V
		K	4,3	(3,5)	V
		R	5,3	(4,5)	V
G113	Milling circumf. (1) circle CCW	Z, K,	4,3	(3,5)	V
		C	4,3	(4,3)	V
		J	3,3	(3,3)	V
		R	5,3	(4,5)	V
G126	Speed limitation, (1,3) aux. spindle 1 [1/min]	S	4,0	(4,0)	V
G152	Zero point shift (1,3)	C	4,3	(4,3)	V
G193	Feed, auxiliary (1,3) spindle 1 (mm/tooth inch/tooth)	F	3.3	(2.5)	V
G195	Feed, auxiliary (1,3) spindle 1 [(mm/rev (inch/rev)]	F	3.3	(2.5)	V
G196	V constant, auxiliary (1,3) spindle 1 [m/minute (feet/min)]	S	4.0	(4.0)	V
G197	Speed [rev/min] aux. spindle 1 (1,3)	S	4,0	(4,0)	V
G226	Speed limitation, (1,3) aux. spindle 2 [1/min]	S	4,0	(4,0)	V
G296	V constant (1,3) [m/min (feet/min)] aux. spindle 2	S	4,0	(4,0)	V
G297	Speed [rev/min] aux. spindle 2 (1,3)	S	4,0	(4,0)	V
G600	SPS function	X,Z	4.3	(4.3)	V
to		C	4.3	(4.3)	V
G699		S	4.0	(4.0)	V
		F,T	6.0	(6.0)	V

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Function	Description	Addresses	Format metr.	(Inch)	V, ?
G900	Return point for inspection cycle	none			
G901	Transfer of actual (1,3) values to variable memory	none			
G902	Transfer of complete current zero point shift to variables memory	none			
G907	Switch off speed (2) surveillance block by block	none			
G908	Set feedrate 100% (2,3)	none			
G909	Interpreter stop (1,3)	none			
G910	Part measuring (1,3)	none			
G911	Tool measuring (1,3)	none			
G912	Detect. actual value (1,3)	none			
G913	End of measuring (1,3)	none			
G915	Monitoring reversal of rotation (1,3)	none			
G920	Inactivate active zero (1,3) point shift	none			
G921	Convert system of units (1,3) to slide position	none			
G940	Switch off block (1,3) display	none			
G941	Switch on block (1,3,5) display	none			
G943	Switch on tool (1,3,5) life monitoring	none			

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Function	Description	Addresses	Format metr.	(Inch)	V, ?
G944	Switch off tool (1,3) life monitoring				
G970	Sector limits (1,3) for graphic representation	X,Z	4,3	(3,5)	
G971	Dimensions of blank (1,3) for graphic representation	X,Z	4,3	(3,5)	
G972	Length of grip area (1,3) for graphic representation	Z	2,3	(1,5)	
G973	Size of graphic (1,3) representation	Q	1,0	(1,0)	
G980	Reactivate zero (1,3) point shift	none			
G981	Reset system of meas. (1,3) to tool specific shifts	none			

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9.2 M functions

Description of the M commands

M 00 -		Program stop
M 01 -		Program optional stop
M 03 -		Main spindle: clockwise run on
M 04 -		Main spindle: counterclockwise run on
M 05 -		Main spindle: off
M 07 -		Coolant: low output on
M 08 -		Coolant: high output on
M 09 -		Coolant: off
M 12 -	(*)	Portal operation: open loading flap
M 13 -	(*)	Portal operation: close loading flap
M 14 -	(*)	C axis: on
M 15 -	(*)	C axis: off
M 16 -		Chip conveyor: off
M 17 -		Chip conveyor: on
M 18 -		Workpiece counter pulse
M 19 -	(*)	Stop spindle in defined position
M 20 -	(*)	Tailstock centre sleeve: forward to workpiece
M 21 -	(*)	Tailstock centre sleeve: return to end position
M 22 -		Completely open main spindle chuck
M 23 -		Clamp main spindle chuck
M 25 -	(*)	Fully open steady rest 1
M 26 -	(*)	Fully close steady rest 1
M 27 -	(*)	Fully open steady rest 2
M 28 -	(*)	Fully close steady rest 2
M 30 -		Program end with return to start

*) Only if the option is available

M 31	-		Feed rate in mm/min
M 32	-		Feed rate in mm/revolution
M 36	-	(*)	Tailstock return
M 37	-	(*)	Tailstock forward
M 38	-	(*)	Steady rest 3 completely open
M 39	-	(*)	Steady rest 3 completely closed
M 41	-	(*)	Gearing stage 1 on
M 42	-	(*)	Gearing stage 2 on
M 53	-	(*)	Driven tools: clockwise running on
M 54	-	(*)	Driven tools: counterclockwise running on
M 55	-	(*)	Driven tools: off
M 57	-		Lubrication pulse
M 58	-	(*)	Fully open steady rest 4
M 59	-	(*)	Fully open steady rest 4
M 72	-	(*)	Spindle indexing: release
M 73	-	(*)	Spindle indexing: clamp
M 74	-	(*)	Pick-off device: swivel to basic setting
M 75	-	(*)	Pick-off device: swing to turning
M 76	-	(*)	Pick-off device: release gripper
M 77	-	(*)	Pick off device: close gripper
M 78	-	(*)	Pick-off device: eject flap closed
M 79	-	(*)	Pick-off device: eject flap open
M 80	_	(*)	User relay 1: off
M 81	_	(*)	User relay 1: on
M 82	_	(*)	User relay 2: off
M 83	_	(*)	User relay 2: on
M 84	_	(*)	User relay 3: off

*) only if the option is available

M 85	_	(*)	User relay 3: on
M 86	_	(*)	User relay 4: off
M 87	_	(*)	User relay 4: on
M 88	-	(*)	User relay 5: off
M 89	-	(*)	User relay 5: on
M 91	-		Program stop without spindle stop
M 92	-	(*)	Chucking device: second pressure off
M 93	-	(*)	Chucking device: second pressure on
M 94	-	(*)	Bar machining: interrogation of bar end
M 99	-	(*)	Program end and automatic new start

*) Only if the option is available